

## Trust Funds. 1894.

*Scientific Relief Fund.*

£3,000 L. & N.W.R. 4 per Cent. Consolidated Guaranteed Stock.  
 £7,200 Great Northern Railway 3 per Cent. Debenture Stock.  
 £4,340 South Eastern Railway 5 per Cent. Debenture Stock.  
 £509 10s. 7d. 2½ per Cent. Annuities.

Cr.  
 £ s. d.  
 982 5 0

Dr.

To Balance { Income.....  
 { Less Capital over-invested .....

	£	s.	d.	£	s.	d.
To Balance { Income.....	862	16	5			
{ Less Capital over-invested .....	571	19	7			
Dividends .....				290	16	10
Interest on Deposit .....				665	0	7
Donations (Capital) .....				14	10	
Balance, Capital over-invested .....	551	9	7	20	10	0
Less Income in hand .....	546	6	10			
				5	2	9

£982 5 0

*Donation Fund.*

£5,030 Great Northern Railway Perpetual 4 per Cent. Guaranteed Stock.  
 The Trevelyan Bequest. £1,861 6s. 8d. Great Northern Railway 3 per Cent. Debenture Stock.

£ s. d.  
 665 0 0  
 364 5 4

By Grants .....

£ s. d.  
 665 0 0  
 364 5 4

To Balance .....

£ s. d.  
 641 19 2

Dividends .....

249 5 7

Transfer from Jodrell Fund .....

138 0 7

£1,029 5 4

£1,029 5 4

*Runford Fund.*

£2,330 2½ per Cent. Consolidated Stock.

	£	s.	d.		£	s.	d.
To Balance .....	223	7	7	By Balance .....	285	9	4
" Dividends .....	62	1	9				
	£285	9	4		£285	9	4

*Bakerian and Copley Medal Fund.*

Sir Joseph Copley's Gift. £1,666 13s. 4d. 2½ per Cent. Consolidated Stock.

£403 9s. 8d. New 2½ per Cent. Stock.

	£	s.	d.		£	s.	d.
To Balance .....	113	4	6	By Gold Medal .....	4	12	7
" Dividends, New 2½ per Cent. Stock .....	9	15	4	" Bakerian Lecture, Professor Thorpe .....	4	0	0
" Dividend—Sir J. Copley's Fund .....	44	8	2	" Gift:—Sir G. G. Stokes .....	50	0	0
				" Balance .....	108	15	5
	£167	8	0		£167	8	0

*The Keck Bequest.*

£800 Midland Railway 3 per Cent. Debenture Stock.

	£	s.	d.		£	s.	d.
To Balance .....	4	3	7	By Payment to Foreign Secretary .....	27	9	1
" Dividends .....	23	5	6				
	£27	9	1		£27	9	1

*Wintringham Fund.*

£1,200 2½ per Cent. Consolidated Stock.

	£	s.	d.
To Balance .....	38	7	4
" Dividends .....	31	19	10
	£70	7	2
By Payment to Foundling Hospital .....			
" Balance .....			
	£70	7	2

*Croonian Lecture Fund.*

One-fifth of the clear rent of an Estate at Lambeth Hill, from the College of Physicians, about £52 per annum.

	£	s.	d.
To Balance .....	2	3	2
Rent .....	50	7	6
" Balance .....	1	13	10
	£54	4	6
By Lecture (1894), Ramon y Cajal .....			
" Expenses .....			
	£50	0	0
	4	4	6
	£54	4	6

*Davy Medal Fund.*

£660 Madras Railway Guaranteed 5 per Cent. Stock.

	£	s.	d.
To Balance .....	79	14	7
" Dividends .....	31	19	2
	£111	13	9
By Gold Medals .....			
" Balance .....			
	£62	16	0
	48	17	9
	£111	13	9

*The Gassiot Trust.*

£10,000 Italian Irrigation Bonds.  
£400 2½ per Cent. Consolidated Stock.

	£	s.	d.	£	s.	d.
To Balance .....	190	16	8	£73	15	2
„ Dividends .....	495	0	9	182	6	0
„ Ten Bonds drawn.....	234	14	4	164	10	7
	<hr/>			<hr/>		
	£920	11	9	£920	11	9
	<hr/>			<hr/>		

By Payments to Kew Committee.....  
„ Purchase of Ten Italian Irrigation Bonds .....

„ Balance .....

*Handley Fund.*

£4,798 Lancashire and Yorkshire Railway 4 per Cent. Guaranteed Stock.

	£	s.	d.	£	s.	d.
To Dividends .....	186	2	4	186	2	4
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By Transfer to Catalogue Account .....

*The Jodrell Fund.*

£5,182 14s. 10d. 2½ per Cent. Consolidated Stock.

	£	s.	d.	£	s.	d.
To Dividends .....	138	0	7	138	0	7
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By Transfer to Donation Fund .....

*Fee Reduction Fund.*

£4,900 Metropolitan 3½ per Cent. Stock.  
£9,333 London and North Western Railway 3 per Cent. Perpetual Debenture Stock (Converted from £7,000 4 per cent. Stock).

	£	s.	d.	£	s.	d.
To Balance .....	143	6	4	342	0	0
„ Dividends .....	435	19	7	231	1	0
	<hr/>			<hr/>		
	£579	5	11	6	4	11
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By Transfer to Royal Society General Account.....  
„ Purchase of £200 Metropolitan 3½ per Cent. Stock .....

„ Balance .....

£579 5 11

*Darwin Medal Fund.*

£2,200 South Eastern Railway 4 per Cent. Debenture Stock.

	£	s.	d.
To Balance .....	477	9	5
„ Dividends .....	85	6	11
	<hr/>		
	£562	16	4
	<hr/>		
			£
			s.
			d.
By Silver Medal .....			0 17 6
„ Gift: Sir J. D. Hooker .....			100 0 0
„ Balance .....			461 18 10
	<hr/>		
	£562	16	4
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*Joule Memorial Fund.*£1,000 London, Brighton, and South Coast Railway Consolidated Guaranteed 5 per Cent. Stock.  
£50 on Deposit on behalf of the Committee.

	£	s.	d.
To Balance .....	97	1	9
„ Interest on Deposit .....	1	6	7
„ Dividends .....	48	8	10
„ Amount withdrawn from Deposit .....	100	0	0
	<hr/>		
	£246	17	2
	<hr/>		
			£
			s.
			d.
By Purchase of £100 London, Brighton and South Coast Consolidated Guaranteed 5 per Cent. Stock .....	163	17	10
„ Balance .....	79	19	4
	<hr/>		
	£246	17	2
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*Brady Library Fund.*

£311 19s. on Deposit Account at Bank.

	£	s.	d.
To Amount on Deposit at Bank November 12th, 1893 .....	307	8	6
„ Interest thereon .....	4	10	6
	<hr/>		
	£311	19	0
	<hr/>		
			£
			s.
			d.
By Balance on Deposit November 12th, 1894 .....	311	19	0
	<hr/>		
	£311	19	0
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*Gunning Fund.*

£1,000 4 per Cent. Bond of His Excellency Dr. Gunning.

To Balance .....	£	s.	d.			
„ Interest .....	60	0	0	By Balance .....	120	0 0
.....	60	0	0			
	<u>£120 0 0</u>				<u>£120 0 0</u>	

*Buchanan Medal Fund.*

£258 9s. 2d. Metropolitan 3 per Cent. Stock.

	£	s.	d.		£	s.	d.
To Cash, per Secretary of the Fund, Dr. Bristowe ...	276	12	0	By Purchase of £258 9s. 2d. Metropolitan 3 per	276	12	0
„ Dividend .....	1	17	6	Cent. Stock ..	1	17	6
	<hr/>			„ Balance .....	<hr/>		
	£278	9	6		£278	9	6
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*Income and Expenditure Account from 12th November, 1893, to 12th November, 1894.*

RECEIPTS.		EXPENDITURE.	
£	s. d.	£	s. d.
To Balance at Bank and in hand 12th November, 1893 :—			
General Purposes .....	185 14 10	By Salaries, and Wages.....	1,443 10 4
Catalogue Account .....	2,200 0 0	" Publications .....	3,259 2 2
Challenger Account .....	500 0 0	" Catalogue of Scientific Papers and Index :—	
Water Research Account .....	0 5 0	Withdrawn from Deposit .....	500 0 0
		Paid out of General Funds .....	254 5 3
	2,885 19 10		754 5 3
Composition and Admission Fees...	70 0 0	Books for the Library .....	321 9 10
" Annual Contributions .....	1,414 0 0	" Miscellaneous Expenses, Office, House, Receptions, &c. ....	1,446 7 9
" Rents .....	696 5 7	Water Research Payments .....	2 16 6
" Dividends and Interest .....	2,596 10 7	" Balance at Bank and in hand :—	
" Sale of Publications .....	678 0 1	General Purposes .....	350 2 6
" Water Research Grants .....	250 0 0	Catalogue Account .....	1,700 0 0
" Receipts on Account of Catalogue...	234 18 10	Challenger Account .....	500 0 0
" Kew Committee Loan repaid .....	200 0 0	Water Research Account .....	247 8 6
" Proceeds of Sale of £722 14s. 1d. India 3 per cent. Stock .....	724 9 2		2,797 11 0
" Proceeds of Sale of £270 11s. 11d. 2½ per cent. Consolidated Stock...	274 18 9		
	£10,025 2 10		£10,025 2 10

The following Table shows the progress and present state of the Society with respect to the number of Fellows :—

	Patron and Royal.	Foreign.	Com- pounders.	£4 yearly.	£3 yearly.	Total.
Nov. 30, 1893 ..	5	48	153	124	181	511
Since Elected ..		+3		+1	+15	+19
Since Compounded			+1		—1	
Since Deceased ..	—1	—3	—4	—8	—4	—20
Withdrawn or Removed ..				—2		—2
Nov. 30, 1894 ..	4	48	150	115	191	508

Account of Grants from the Donation Fund in 1893-94.

	£	s.	d.
Prof. J. Milne, in further aid of his Seismographic Investigations .....	100	0	0
Prof. Liveing, to enable Mr. W. J. Sell to continue certain Chemical Researches.....	25	0	0
W. T. Thiselton Dyer, to further aid Mr. Theodore Bent in making Botanical Collections in Southern Arabia ..	50	0	0
Measurement of Plants and Animals Committee (per F. Galton) for conducting Statistical Inquiries into the Measurable Characteristics of Plants and Animals....	50	0	0
Dr. H. Hicks, to enable Mr. J. Lewis Abbott to continue his Exploration of an Ossiferous Fissure near Ightham	10	0	0
Prof. G. H. Darwin, to assist him in his work on Periodic Orbits .....	30	0	0
Sir A. Geikie, to assist Miss M. M. Ogilvie in her Geological Researches.....	50	0	0
Prof. J. B. Sanderson, to assist Mr. H. M. Vernon in his Physiological Researches .....	25	0	0
Prof. McKendrick, to further aid Dr. Jack in Researches on Muscular Movements.....	5	0	0
Prof. W. C. Williamson, in aid of his Researches on Fossil Plants .....	10	0	0
Capt. Abney, for aid in his Researches on Colour.....	40	0	0
Carried forward.....	£395	0	0
	F 2		



	£	s.	d.
Brought forward . . . . .	395	0	0
Prof. W. M. Hicks, to aid him in his Experiments on the Higher Recalescence Point of Iron . . . . .	20	0	0
Refunded Government Grant Committee (additions to Royal Society's telescope) . . . . .	250	0	0
	<u>£665</u>	<u>0</u>	<u>0</u>

“Electrical Interference Phenomena somewhat analogous to Newton's Rings, but exhibited by Waves along Wires.”  
By EDWIN H. BARTON, B.Sc., late “1851 Exhibition”  
Science Scholar. Communicated by Professor ARTHUR  
W. RÜCKER, M.A., F.R.S. Received February 20,—Read  
April 19,—Abbreviated\* July, 1894.

#### INTRODUCTION.

The preliminary paper on this subject† gave the results of a single experiment, and approximately accounted for them by a mathematical theory of the reflexion and interference phenomena involved.

Since the publication of that paper the question of disturbances has been investigated, the experimental conditions improved, and various results obtained in confirmation of the original conclusions.

These matters form the subject of the present communication.

The apparatus employed for observing the interference phenomena is diagrammatically represented in fig. 1 and explained in the notes accompanying it.

In Experiment VII the electrometer was placed at HH' instead of EE', its usual position. In Experiments VIII and IX two electrometer needles were used, their respective attachments being at FF' and HH'.

The lengths of SAM and MD, and the special construction of the abnormal part will be specified as required in the course of the paper when reference is made to the figure.

In the former paper‡ it was shown that in the case of a train of electrical waves advancing along the secondary from AA' towards DD' fig. 1, we have the following phenomena:—

- (1.) A partial reflexion at BB', the beginning of the abnormal part;
- (2.) A partial reflexion at CC', the end of the abnormal part; and
- (3.) Interferences between the two sets of waves proceeding from BB' and CC' respectively.

\* The references given in the abstract of this paper ('Proceedings,' vol. 55, p. 350) are to the full manuscript, preserved in the archives of the Royal Society.

† 'Proc. Roy. Soc.,' vol. 54, pp. 85—96.

‡ *Loc. cit.*, p. 87.